

## 10.9 Routing Procedure

The most commonly used method for routing inflow hydrograph through a detention pond is the Storage Indication or modified Puls method. This method begins with the continuity equation which states that the inflow minus the outflow equals the change in storage ( $I - O = \Delta S$ ). By taking the average of two closely spaced inflows and two closely spaced outflows, the method is expressed by equation 10.29. This relationship is illustrated graphically in Figure 10-19.

$$\frac{\Delta S}{\Delta t} = \frac{I_1 + I_2}{2} - \frac{O_1 + O_2}{2} \quad (10.29)$$

where:  $\Delta S$  = change in storage,  $m^3$  ( $ft^3$ )  
 $\Delta t$  = time interval, min  
 $I$  = inflow,  $m^3$  ( $ft^3$ )  
 $O$  = outflow,  $m^3$  ( $ft^3$ )

In equation 10.29, subscript 1 refers to the beginning and subscript 2 refers to the end of the time interval.

Equation 10.29 can be rearranged so that all the known values are on the left side of the equation and all the unknown values are located on the right hand side of the equation, as shown in equation 10.30. Now, the equation with two unknowns,  $S_2$  and  $O_2$ , can be solved with one equation. The following procedure can be used to perform routing through a reservoir or storage facility using equation 10.30.

$$\frac{I_1 + I_2}{2} + \left( \frac{S_1}{\Delta t} + \frac{O_1}{2} \right) - O_1 = \left( \frac{S_2}{\Delta t} + \frac{O_2}{2} \right) \quad (10.30)$$

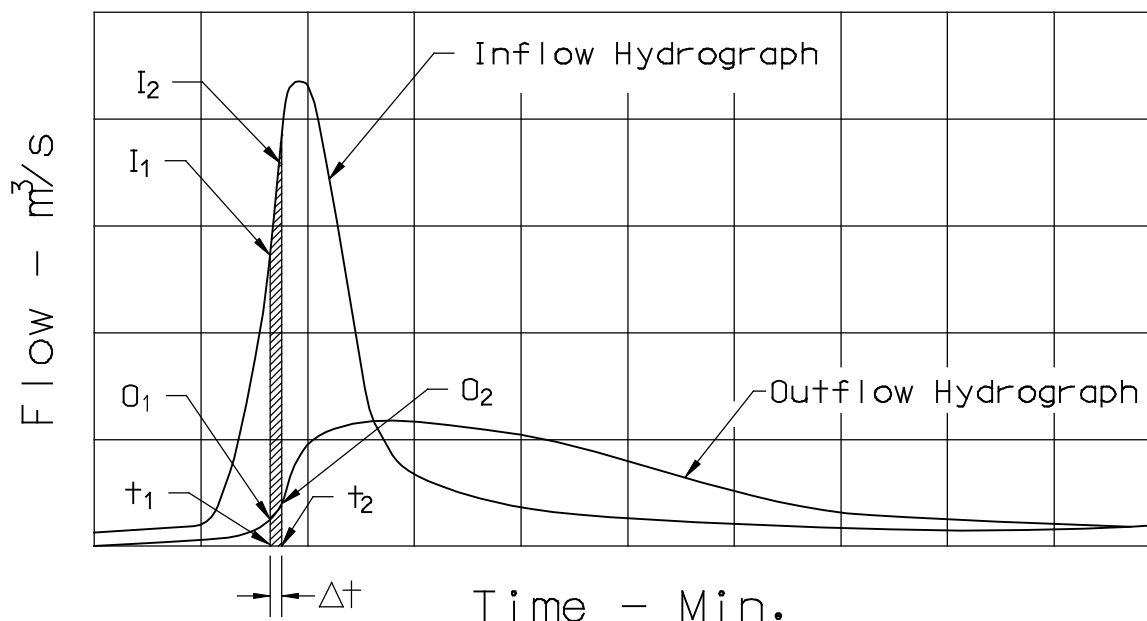


Figure 10-19 Routing hydrograph schematic